REMARKS

Upon entry of this amendment, claims 1-14, and 53-56 are pending, and of these claims 1, 5, and 53 are independent. Applicants have cancelled claims 15-52 in accordance with the elections made in the response to the restriction requirement filed 12/23/2004. Applicants respectfully reserve the right to represent claims 15-52 in a continuation or divisional application.

Applicants have amended claims 1, 5, and 53 to include the limitations of optical fiber elements being coupled to an interface that aligns the ends of each optical fiber element with an area for synthesizing a probe feature on the substrate, the support for which may be found in paragraphs 0052 *et seq.*, 0055 *et seq.*, and 0059 *et seq.* of the present application. Applicants have also amended each of claims 1, 5, and 53 to clarify the claim scope with respect to a set of optical fiber elements switched to a substantially light passing state, and the aligned areas of the substrate that correspond to the optical fiber elements of the first set. Claims 2, 4, 6-8, and 12-14 have been amended for consistency with claims 1 and 5.

Applicants have also amended claim 4 to include the optical fiber elements that comprise one or more optical fibers or one or more segments of optical fibers the support for which may be found in paragraph 0047 *et seq.*

Applicants have added new claims 55-56 directed to the interface that comprises wells with tapered walls and optical fiber elements with ends that are tapered in a complementary fashion to the wells, the support for which may be found in paragraph 0059 *et seq.*

Applicants assert that no new matter is presented by these amendments and respectfully request entry of the same.

Reply to Claim Rejections – 35 U.S.C. §112

Claims 5-14 are rejected under 35 U.S.C. §112, second paragraph. Applicants have amended the preamble of claim 5 to illustrate the intended purpose for the claim. In particular Applicants have amended the preamble to recite the intended purpose of aligning one or more optical fiber elements with an area for synthesizing a biological probe feature on each of one or more substrates.

Thus Applicants respectfully assert that claim 5 is definite as amended and request that the rejection under 35 U.S.C. §112 be withdrawn. Further, claims 6-14 each depend from claim 5 in the chain of dependency and are thus definite for the same reasons.

Reply to Claim Rejections – 35 U.S.C. §102

Claims 1-3, 5-14, and 53 are rejected under 35 U.S.C. §102(b) over Gao et al. (WO 99/41007). The disclosure of Gao et al. is generally directed to synthesizing arrays of biological molecules in parallel, and employing an apparatus for directing patterns of light at a substrate that de-protects molecules at the surface for chemical synthesis of probe molecules. In particular, Gao et al. describes the apparatus for directing patterns of light to include a digital micromirror device (DMD).

Applicants have amended claims 1, 5, and 53 and respectfully assert that the disclosure of Gao et al. does not describe the claimed invention as amended. In particular, Applicants have amended each of claims 1, 5, and 53 to include the limitation of directing a light beam onto a plurality of optical fiber elements that dispose light onto a substrate when in a substantially light-passing state. Applicants respectfully assert that Gao et al. does not describe or suggest directing patterns of light on to a substrate using optical fiber elements, rather Gao et al. describe to use of DMDs for the control and direction of patterns of light on to a substrate. The differences of how patterns of light are created and directed to a substrate are significant because the different advantages between methods of pattern generation and direction are conferred, such as for example, the flexibility of creating different light patterns, cost of an apparatus, or manufacturing cost of biological arrays.

Additionally, Applicants have amended each of claims 1, 5, and 53 to include the limitation of each optical fiber element being operatively coupled to an interface that aligns each element with an area on the substrate for synthesizing a probe feature. As described above, Applicants assert that Gao et al. does not teach or suggest the creation and direction of light patterns by using optical fiber elements, thus Applicants further assert that Gao et al. does not teach or suggest optical fiber elements that are operatively coupled to an interface that aligns each optical fiber element with an area of the substrate.

Therefore, for the reasons described above Applicants respectfully assert that each of claims 1, 5, and 53 as amended are patentable. Further, each of

claims 2-4, 6-14, and 54 each depend from one of claims 1, 5, or 53 and are thus patentable for the same reasons.

Claims 1-7, 13, and 53 are rejected under 35 U.S.C. §102(a) over Braun et al. (US 6,819,843). Braun et al. generally describes synthesizing arrays of biological molecules by means of optical fibers where the biological molecules are synthesized on the optical fibers themselves, or alternatively upon a separate support or substrate. In particular, Braun et al. describes a bundle of optical fibers "arranged" (Braun et al. col. 4, line 25 *et seq.*), where the end of each optical fiber "must be introduced over each grid point" so that the light emanating from the fiber illuminates the grid point on the substrate (Braun et al. col. 4, line 64 *et seq.*).

Applicants respectfully assert that the disclosure of Braun et al. does not describe or suggest the invention as claimed. As described above with respect to the rejection under 35 U.S.C. §102(b), Applicants have amended each of claims 1, 5, and 53 to include the limitation of each optical fiber element being operatively coupled to an interface that aligns each element with an area on the substrate for synthesizing a probe feature.

Applicants respectfully assert that Braun et al. does not describe operatively coupling the end of each optical fiber element with an interface, where the interface provides the alignment of each optical fiber with an area on the substrate. Rather Braun et al. describes an arrangement of optical fibers, but no disclosure of any particular structure employed to ensure such an arrangement.

In fact, Braun et al. goes on to describe an unarranged alternative of the optical fibers in the event that the act of arranging the fibers becomes too time consuming (Braun et al. col. 5, line 59 *et seq.*). Applicants respectfully assert that the statement regarding the time consuming nature of arranging the optical fibers indicates a lack of additional structure for the arrangement steps, for instance by acknowledgement of the difficulty associated with arranging a bundle of fibers without mechanical assistance. The interface of the claimed invention provides an advantage over attempting to arrange the optical fibers manually as a bundle of fibers by providing a structural means of alignment and a measure of mechanical stability as described in paragraph 0053 of the present application.

Therefore, for the reasons described above Applicants respectfully assert that each of claims 1, 5, and 53 as amended are patentable. Further, each of claims 2-4, 6, and 13 each depend from one of claims 1 or 5 and are thus patentable for the same reasons.

Claims 5-9, 11-14, and 53 are rejected under 35 U.S.C. §102(e) over Adams et al. (US 6,156,494). Adams et al. generally describes the assembly of biological molecules using optical fibers as a support or substrate.

Applicants respectfully assert that the disclosure of Adams et al. does not describe or suggest the invention as claimed. As described above with respect to the rejections under 35 U.S.C. §102(b) and (a), Applicants have amended each of claims 1, 5, and 53 to include the limitation of each optical fiber element being operatively coupled to an interface that aligns each element with an area on the

substrate for synthesizing a probe feature. The disclosure of Adams et al. does not describe or suggest the alignment of the optical fibers with another substrate.

Adams et al. describes the optical fibers themselves each as a substrate (Adams et al. col. 5, line 14 *et seq.*), where each optical fiber comprises a first and second region. But there is no description in Adams et al. of aligning an optical fiber with a substrate, for instance there is no description of aligning one optical fiber with either the first or second regions of another optical fiber that functions as the substrate.

For example, Adams et al. describes orienting the optical fibers relative to each other, i.e. contiguously or non-contiguously (Adams et al. col. 4, line 41 *et seq.*; Figures 1-3). Figures 1-3 of Adams et al. illustrate the nature of orientation described in the specification where each optical fiber lies parallel to each other, in the illustrations the ends of each fiber are not aligned to any other optical fiber or other type of substrate for assembly of biological molecules. Therefore, the description of Adams et al. is different that the claimed alignment of each of the optical fiber elements with an area on a substrate.

Further, there is no discussion in Adams et al. of structure that performs an alignment or orientation step. In particular, Adams et al. does not describe an interface that operatively couples to an optical fiber, and further where the interface aligns an end of the optical fiber with a substrate.

Therefore, for the reasons described above Applicants respectfully assert that each of claims 5 and 53 as amended are patentable. Further, each of claims

6-9, and 11-14 each depend from claim 5 and are thus patentable for the same reasons.

Reply to Claim Rejections – 35 U.S.C. §103

Claim 4 is rejected under 35 U.S.C. §103(a) over Gao et al. (WO 99/41007) in view of Adams et al. (US 6,156,494). As described above with respect to the rejections under 35 U.S.C. §102(b) and (e), Applicants have amended claim 1 to include limitations that neither Gao et al. nor Adams et al. describe. In particular, claim 1 recites the limitations of each optical fiber element being operatively coupled to an interface that aligns each element with an area on the substrate for synthesizing a probe feature. Thus, claim 4 which depends from claim 1 cannot be obvious with respect to the disclosures of Gao et al. and Adams et al., because the references do not describe either alone or in combination each claimed limitation.

Therefore, Applicants respectfully assert that claim 4 is patentable.

Claim 54 is rejected under 35 U.S.C. §103(a) over Gao et al. (WO 99/41007) in view of Schembri et al. (US 6,518,056). Similarly, Claim 54 is rejected under 35 U.S.C. §103(a) over Adams et al. (US 6,156,494) in view of Schembri et al. (6,518,056).

As described above with respect to the rejections under 35 U.S.C. §102(b) and (e), Applicants have amended claim 53 to include limitations that neither Gao et al. nor Adams et al. describe. In particular, claim 53 recites the limitations of

each optical fiber element being operatively coupled to an interface that aligns each element with an area on the substrate for synthesizing a probe feature. Therefore, there is no disclosure of each of the limitations of claim 53 in any of the references either alone or in combination. In particular combining the customer data described by Schembri et al. with the disclosure of Gao et al. or Adams et al. does not make claim 54 which depends upon claim 53 obvious.

Further, Applicants respectfully disagree with the Examiner and assert that Schembri et al. does not describe the processing steps as recited in claim 54. In particular the processing of customer orders to provide array configuration data that is processed to provide probe array design data that is further processed to provide gating data. For example, in col. 15, lines 54-58, Schembri et al. states:

> "The array writer 20 supports customer's needs for 'experiment on demand' research. The specific information needed to synthesize a custom array is captured in an electronic file. The array writer 20 of the present invention reads the electronic file."

The disclosure of Schembri et al. describes capturing information in a file that is read by the array writer, in other words the information is received and stored for use by the array reader without an active processing step. The processing steps as recited in claim 54 is different than the "customer data" of Schembri because the claimed invention takes information as input, processes the information to produce an output that is then processed again to provide gating data that provides the information for the substantially light passing and not-passing states. Additionally, Applicants respectfully assert that such a combination of processing steps is not inherent to the "specific information

needed to synthesize a custom array" disclosure of Schembri et al. because of the variety of ways and numbers of steps that data could be processed into useful data needed for synthesizing an array.

Therefore, Applicants respectfully assert that claim 54 is patentable.

Claims 1-4, and 10 are rejected under 35 U.S.C. §103(a) over Adams et al. (US 6,156,494)in view of Fodor et al. (WO 92/10092). As described above with respect to the rejections under 35 U.S.C. §102 (e), Applicants have amended claim 1 to include limitations that Adams et al. does not describe. In particular, claim 1 recites the limitations of each optical fiber element being operatively coupled to an interface that aligns each element with an area on the substrate for synthesizing a probe feature. Applicants also respectfully assert that the disclosure of Fodor et al. similarly fails to describe the limitations of claim 1, and thus neither of the references describes the limitations of claim 1 either alone or in combination.

Therefore, Applicants respectfully assert that claim 1 is patentable, and also respectfully assert that claims 2-4 and 10 each depend from claim 1 in their chain of dependency and are thus patentable for the same reasons.

CONCLUSION

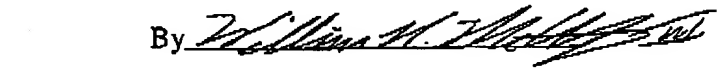
In conclusion, Applicants have amended each of claims 1, 5, and 53 to include limitations that none of the references applied under 35 U.S.C. §102 or §103 disclose and thus respectfully assert that each are patentable. Further, since claims 2-4, 6-14, and 54-56 each depend from one of claims 1, 5, or 53 in their chain of dependency each are thus patentable for the same reasons.

For these reasons, Applicants believe all pending claims are now in condition for allowance. If the Examiner has any questions pertaining to this application or feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned at (781) 280-1522.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account 01-0431.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

By 

William R. McCarthy III, Reg. No.: 55,788

Customer No.: 22886
Legal Department
Affymetrix, Inc.
3380 Central Expressway
Santa Clara, CA 95051
Tel: 408/731-5000
Fax: 408/731-5392